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China's Nuclear Force Modernization and the Changing
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EXECUTIVE SUMMARY

Title: China's Force Modernization and the Changing Concept of Nuclear Deterrence

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Thesis: China's concept of nuclear deterrence is changing as evidenced by the quantitative and qualitative improvements to Chinese weapon systems.

Discussion: The purpose of this paper is to analyze China's nuclear program in the larger context of international and regional security issues, weapons development, military doctrine, and domestic politics. These variables have historically determined the size and shape of China's nuclear forces and provided the basis for the mid-1980s modernization programs. By understanding these factors, and their impact on weapons development, current nuclear capabilities can be assessed and provide a framework for analyzing future force developments. China's nuclear arsenal and concepts of deterrence were developed in a context of expediency and technological constraint. However, current economic growth rates provide sufficient resources to modernize nuclear forces. A declassified National Intelligence Estimate from the late 1960s linked China's aspirations of great power status to development of a substantial strategic capability. Is China's "peaceful rise" designed to maintain the credibility of its small strategic capability or is masking a growing strategic capability, consisting of advanced conventional and improved nuclear capacities? The commander of the Pacific Command, Admiral Willard indicated in testimony that China's lack of transparency raises questions about its "peaceful rise" policies. Upgrades to equipment and weapon systems are being accompanied by changes in strategic thinking, which is expanding the roles and missions of nuclear weapons. A layered approach to deterrence is emerging, characterized by a convergence of nuclear and conventional capabilities at the operational and tactical levels of war, while strategic level is still defined in terms of retaliation and minimal deterrent capabilities.

Conclusion: China's concept of deterrence is changing as evidenced by the quantitative and qualitative changes in its ballistic missile force structure. The old strategic doctrine of Mao's era was characterized by a small force structure, minimally capable (retaliatory in nature) and defensive in posture. With a small number of nuclear weapons, deterrence was always vulnerable to a disarming first strike, and required that survivability was a top priority. The small retaliatory force provided little to no options in an escalatory situation where deterrence fails. The impetus for China's modernization effort was to ensure a credible nuclear deterrent for modern conditions and create military options both nuclear and conventional, at the theater level.

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PREFACE

The purpose of this paper is designed to analyze China's nuclear weapons capability in the larger context of its overall military modernization effort. By considering the variables shaping China's military modernization-- international and regional security issues, domestic politics and military doctrine--an understanding of China's concept of nuclear deterrence can be assessed and its future directions appreciated. China's nuclear arsenal and concepts of deterrence developed in a context of Cold War competition between nuclear superpowers of whose arsenal China could not match. Initially China's nuclear arsenal was characterized by expediency and technological constraint; however, current economic growth rates provide sufficient resources and remove many of the historic constraints.

The question becomes is China's modernization designed to maintain a creditable deterrent capability for its small strategic force or is the introduction of new weapon systems accompanied by a change in strategic thinking in which these new technologies are expanding the role and mission of its nuclear weapons. This paper will argue that China is developing a nuanced approach to deterrence one that is characterized by a convergence of nuclear and conventional capabilities at the operational and tactical levels of war, while the strategic level remains defined in terms of retaliation and minimal capabilities.

The completion of this analysis was assisted immensely by my academic mentors Dr. Francis Marlo and Dr. Rebecca Johnson. Their comments and insights helped to maintain the focus of my research and improve my analysis. Finally I would be remiss if I did not acknowledge the contributions of my family, my wife Delaine, and children Dylan and Hannah whose patience

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September 2009 marked the 60th anniversary of the founding of the People's Republic of China (PRC). As part of the ceremonies celebrating the development of modern China, the PRC held a military parade in Beijing to showcase its growing military capabilities. As the Soviet Union had done in earlier times, the Chinese took the opportunity to prominently display their most modern weapon systems, including the Dongfeng (DF) series of mobile launchers.¹ Most prominent of these road mobile launchers were the solid propellant, DF-31A Intercontinental Ballistic Missiles (ICBM), with an operational range of 13,000 km and capable of targeting the eastern portion of the United States.² These mobile ICBM launchers were designed to supplement China's current silo-based strategic nuclear deterrent, thus improving the survivability of China's nuclear deterrent. Also displayed during the military parade were mobile medium range nuclear and conventional ballistic missiles (MRBM) DF-21s, with operational ranges of 1800 km designed to provide Chinese military planners with options to regional contingencies.³

Despite the 2009 military displays in Beijing, China's nuclear forces remain some of the most hidden, secretive and least understood of China's military forces. Opaqueness has always described China's operational capabilities, which create challenges in assessing the past, present and future roles of nuclear weapons.⁴ Like most countries that possess small quantities of nuclear weapons, secrecy is an operational requirement. Maintaining a credible deterrent requires ambiguity about quantity and quality of weapons and how and when they would be used. Unlike other countries with small nuclear weapons capabilities, however, China's economic growth has altered its position in the international system and removed many of the past limitations to nuclear modernization.⁵ Admiral Willard Commander of the Pacific Command described the dilemma of the Chinese military modernization in testimony before the

House Armed Services Committee: “China’s build up of conventional and advanced weaponry, including nuclear ballistic and cruise missiles is described as defensive...Beijing’s lack of transparency call such assertions into question.”⁶

China itself seems to be struggling with its place in the world and the role that its military forces will play. It continues to assure anxious neighbors that its economic growth and military modernization programs are defensive and consistent with its “peaceful rise” policies. China’s economic rise accelerated in the past decade, establishing it as the second largest economy behind the U.S. However, contradictions emerge particularly in regard to its strategic systems, where advanced technologies are being integrated and operational capabilities improved for regional contingencies, such as Taiwan. Moreover, China is gaining a new confidence in its relationship with the U.S., becoming more assertive and resistant to U.S. political and economic pressure. Greater Chinese regional capabilities increase the threat to U.S. regional allies and encourage stronger Chinese efforts to reduce U.S. influence regionally. A Central Intelligence Agency Assessment from 1963 captured United States thinking about China strategic programs: “China clearly aspires to great power status and Chinese leaders have given a high priority to developing a substantial strategic capability as essential to such status.”⁷

This paper will argue that China’s concept of nuclear deterrence is indeed changing as reflected by the qualitative and quantitative improvements to its nuclear force structure. Upgrades to equipment and weapon systems are being accompanied by changes in strategic thinking, suggesting that China is becoming more offensive in posture and preparing to be more assertive in terms of regional security issues. Modernization is bifurcating China’s stance on nuclear deterrence: mobility at the strategic level is designed to enhance the old capabilities of China’s defensive minimal deterrent capability; however, at the theater level mobility is

providing new operational capabilities and is likely providing Chinese leaders with a greater range of military options.

The purpose of this paper is to analyze China's nuclear program in the larger context of international and regional security issues, military doctrine, domestic policies, and weapons development. These variables historically determined the size and type of nuclear forces that China was capable of building and provided the basis for the mid-1980s modernization programs. Understanding these factors, and their impact on force structure and weapons development, provides an analytical framework for assessing China's strategic thinking, namely about deterrence, and the direction that concept may take in the future. As China's strategic position changes, its operational military capabilities are also changing to reflect its growing regional influence.

For most of the last half-century, modern China's poor economic performance and minimal industrial base constrained the country's ability to respond effectively to changes in its threat environment. Decisions on force modernization and concepts of deterrence were based on expediency, defined by resource and technological constraints. A decades-long surge in economic activity, and prospects for continued economic growth, mitigate these earlier impediments to modernization. Upgrades to equipment and weapon systems are being accompanied by changes in strategic thinking, which is expanding the roles and missions of nuclear weapons. If expediency defined the initial efforts to develop nuclear weapons, then China's current nuclear program has evolved beyond issues of sufficiency and effectiveness.⁸ A layered approach to deterrence is emerging, characterized by a convergence of nuclear and conventional capabilities at the operational and tactical levels of war, while strategic level is still defined in terms of retaliation and minimal deterrent capabilities.

The Chinese decision to develop nuclear weapons was based on calculations of security. The Chinese Communist defeated the Nationalists in a civil war that ended in 1947. Despite the Communists control of the mainland and the Nationalists retreat to the island of Taiwan, the United States refused to recognize their victory, instead recognizing the Nationalists as the legitimate government of China. The United States intervened with naval forces in 1948 and later in 1954 and 1958 to protect the Nationalist government from communist Chinese aggression.⁹ Unable and unwilling to commit ground forces to Taiwan's defense, the United States suggested that nuclear weapons were an option in conflicts involving Taiwan.¹⁰

The growing nuclear superiority of the United States in the early 1950s, and its threats to use nuclear weapons, forced the PRC leadership to reconsider the Soviets commitment to their security. The Chinese leadership doubted whether the Soviets would risk provoking the U.S. or defend China if Soviet cities were held at risk. The uneasiness over Soviet commitments to Chinese security increased as relations with the Soviet Union cooled appreciably after Stalin's death in 1953.¹¹ The PRC had charted an increasingly independent course from the Soviets, with Mao advocating an alternative path to socialism for the less industrial non-European countries. As the decade progressed and tension in the Sino-Soviet relationship increased, Soviet support slowly eroded, growing less helpful. A Chinese research official derisively described Soviets technicians as "mute monks who read but do not speak."¹²

By 1960 Soviet assistance had ended, leaving nuclear-related infrastructure projects partly complete. Likewise, the Soviets had failed to provide the PRC with a prototype nuclear weapon as required by an earlier security agreement.¹³ It would take the PRC an estimated four billion dollars and four additional years to conduct its first successful atomic test.¹⁴ Following the 1964 test, the search for an effective delivery platform provided another formidable hurdle to overcome.

The tension with the Soviet Union also redefined China's threat environment, which now included a real possibility of a Soviet invasion from the north. The PRC security situation was becoming more complex as "the United States was the primary foe before 1970 and the Soviet Union was increasingly seen as an adversary after 1960."¹⁵ Regardless of the adversary, the PRC nuclear program was characterized by its lack of status: lack of resources, lack of technical capability and a lack of delivery systems. Although the PRC had conducted an atomic test in 1964 it still lacked an effective deterrent against potential military aggression. Until an effective ballistic missile capability could be developed and deployed, deterrence would be maintained in two ways. First, the People's Liberation Army (PLA) Air Force provided a delivery platform, while a ballistic missile capability was developed. Second, denial and deception techniques were employed to hide the lack of nuclear capabilities.¹⁶

Military Doctrine and Strategic Nuclear Forces

China's decision to develop nuclear weapons was a rational choice to balance the current security challenges of the United States and a hedge against increasingly unreliable Soviet security assurances. The dilemma for Chinese military strategists was that the development of an atomic bomb and the means to deliver it were years away. In the interim, China would have to rely on its "People's War" construct to deter potential military threats. Mao called the United States with its nuclear weapons a "paper tiger" unable to subdue China with just technological superiority.¹⁷ Early concepts of strategic deterrence contained in the people's war construct advocated absorbing a nuclear strike and maintaining enough conventional fighting strength to deter aggression. To Mao nuclear weapons were not the decisive factor in warfare even though they held enormous destructive capabilities. He argued that a country the size of China could

not be defeated with only nuclear strikes so an adversary also needed to launch conventional attacks to win.¹⁸

The assumption that a ground invasion would need to accompany nuclear strikes placed the emphasis back on the human element of warfare and meant early Chinese military policies contained a requirement for a strong civil-defense program.¹⁹ Protecting the human element by mitigating the effects of nuclear war on the populace was an essential aspect of strategic deterrence. Unable to match the nuclear arsenals of the two superpowers, Mao saw China's nuclear deterrence as weak and the People's Liberation Army (PLA) as the primary military capability guaranteeing Chinese sovereignty.

The unique Chinese concept of strategic deterrent, however, hindered the development of strategic thinking about nuclear weapons by elevating man over technology.²⁰ Limited capabilities meant that China's strategic thought would be tempered by the reality of the situation and reactive to external influences, namely the military capabilities of the two superpowers. Mao's paper tiger comment is illustrative of a duality in China's strategic thought, a tension between reality and aspiration. The reality of nuclear weapons is that China could not develop a significant capability, so they were discounted as a determinate of war; on the other hand, China needed them, and developed them, to balance other nuclear powers and prevent nuclear blackmail. Mao's rhetoric aside, the reality of limited capabilities stunted strategic thinking about nuclear weapons and their role in China's national power. Nonetheless, without a nuclear weapon China would remain vulnerable to what the leadership labeled "nuclear blackmail."²¹

The military doctrine of the PRC evolved as military capabilities improved and as China's perceptions of its security environment changed. The people's war was a reality of post-World

War II China torn apart internally by civil war and struggling economically with failed socialist programs. Nuclear weapons fit into Mao's concept of strategic deterrence and initially, were based on what was possible, creating a minimal retaliatory capability consistent with the concepts of active defense.²² Initial PRC concepts of strategic deterrence were based on a combination of natural geography and preservation of enough conventional capability to provide an active defense against a ground invasion.

From 1947 to 1979, Chinese society was decimated first by civil war and then by Mao's failed socialist experiments, which guaranteed asymmetrical concepts would define China's military doctrine. However, China's border war with Vietnam in 1979 exposed serious problems in the PLA.²³ The performance of the PLA as a fighting force was dismal; PLA forces lacked professional, modern equipment and its guerilla tactics did not apply well to offensive operations. In addition, PLA commanders had no experience in commanding large formations nor did they have the communications capability to integrate firepower and maneuver into combined arms warfare.²⁴ Critiques of the people's war concept had been building since Mao's death in 1976 but the PLA's poor performance in Vietnam would be the catalyst for major reforms. Reforms integrated technology and modern weapons into the PLA, while cutting the bloated size of the military. For the first time China's calculation of strategic deterrence was being modified and the human element of warfare was not the most important factor in deciding victory. The PLA was integrating modern tactics into its training regiments.

The doctrinal reforms of the PLA coincided with changes to the strategic force structure. The deployment of the CSS-4 ICBM, capable of ranging the continental U.S, provided China with a modest second-strike capability.²⁵ However, the small number deployed meant China's retaliatory capability was vulnerable to a nuclear first strikes or even conventional preemptive

strikes. To improve survivability, China dispersed the CSS-4 missiles to different locations, hardened the silos and shrouded their operational capabilities in secrecy to deny assessment of their capabilities.²⁶

The foundational assumptions of Mao's revolutionary China gave way to a more modern view of warfare. By the mid 1980s, Deng Xiaoping was in firm control of leadership and his societal and military reforms were designed to move China into the modern era. The primary assumption of the people's war was based on the inevitability of war against imperialism (the United States), and in the modern era that most likely would be total war, involving nuclear and conventional forces. China, based on Mao's revolutionary worldview, poured enormous resources into developing nuclear weapons, as well as civil-defense programs that were designed to mitigate the effects of nuclear war.²⁷ Before 1985 China looked to develop a credible nuclear deterrent but if that failed, it was prepared to survive nuclear strikes and defeat a ground invader with protracted guerrilla warfare.

Deng Xiaoping reevaluated Mao's assumption of inevitable warfare ending in a protracted struggle, likely involving nuclear weapons, and came to a different conclusion. As a realist, Deng saw the balancing of power in the international system, Reagan's military buildup in the 1980s restored parity between the superpowers, which in turn diminished the potential for global conflict.²⁸ Freed from planning for global war, mostly likely fought with nuclear weapons, China could reorient society and its economy to focus on economic development; no longer needing to prepare for global conflict in a nuclear age, China's military planners could shift resources to modernizing its strategic forces and focus on regional challenges.

Events in the international system confirmed for the Chinese strategic thinkers that future warfare would be local and limited in scope. Chinese analysts pointed to the Soviet invasion of Afghanistan and the Iran-Iraq war as models for a limited war concept. Based on these new doctrinal assumptions of limited warfare, the outlines of a new security environment began to emerge:²⁹

- Fighting tended to be local and the potential to spread globally was limited. Even regional expansion was unlikely.
- The actors involved in these conflicts were usually limited, typically two.
- Large conventional forces, typically ground units supported by artillery fires, were typical. The use of air power was minimal or of limited value and was completely discounted by Chinese planners.

For military planners and strategists, the changing threat environment meant a shift from total war concepts to regional threats, namely along their borders. Changes to military doctrine resulted in proposed changes to military force structure. Research and development on solid propellant ballistic missiles received a high priority and deployment of these solid systems were essential to meeting these new regional threats.³⁰ A common theme of these new weapons systems were mobility and ranges designed to meet regional threats. The research and development efforts of the 1980s would come to fruition a decade later with the deployment of the DF-21 series of nuclear, and later conventional, mobile MRBM launchers.³¹ These medium range ballistic missiles provided Chinese military planners with increased capabilities and operational flexibility to meet regional challenges.

The final stage of PLA doctrinal evolution occurred following the first Gulf War in 1991 and continues today, as Chinese military planners integrate the lessons learned into the modern day PLA. The first Gulf War was a seminal event for Chinese military leaders.³² Chinese analysts had predicted the United States would suffer a similar fate in Iraq as the Soviets had a decade

earlier in Afghanistan. However, the U.S. performance against the Iraqi army, partially equipped with Chinese equipment, was shocking. The U.S.-lead victory in Iraq contradicted many of the assumptions on which China's limited warfare doctrine was based.³³ The use of precision guided munitions, stealth technologies and the ability to sustain rapid high tempo operations impressed Chinese analysts. However, the use of airpower was the most disconcerting development. The ease with which the U.S. gained air supremacy and the use of air assets to create depth on the battlefield was a cause of concern given the lack of China's air defense capability.³⁴ The ability to extend the depth of the modern battlefield with airpower meant that China's emerging military capabilities, including its nuclear deterrent, were once again vulnerable.

By the end of the 1990s, Chinese military analysts assessed that a revolution in military affairs (RMA) had occurred and the fundamental character of warfare was changing.³⁵ Despite two decades of evolving doctrinal reforms, the Chinese had failed to anticipate the RMA and were falling precariously behind U.S military capabilities. Unable to compete with the conventional capabilities of the U.S., and with its nuclear deterrent increasing at risk, China looked to asymmetrical capabilities to combat the growing dominance of the United States. The U.S. overreliance on technology, primarily from satellites offered Chinese military planners a critical vulnerability. Developing technologies such as anti-satellite (ASAT) and cyber capabilities against defense networks provided a method to attack U.S. vulnerabilities and reinstate a balance in strategic deterrence.³⁶

The use of asymmetrical tactics against a superior military force is reminiscent of Mao's earlier revolutionary writings. In fact, China's doctrinal evolution parallels Mao's writings on the stages that successful insurgencies pass through on their way to legitimacy. Mao identified

three phases of revolutionary warfare: strategic retreat to preserve fighting capabilities, strategic force equilibrium, and the final stage in which the insurgency develops regular forces capable of conducting regular operations against government forces.³⁷ China's strategic doctrine followed a similar pattern from 1949 through 1985. China balanced the United States and Soviet Union with a small a number of nuclear weapons, providing strategic cover and allowing force capabilities to evolve. On the regional level, China force structure evolved towards equilibrium and developed capabilities that allowed them to actively protect their interests in a regional context. However, the United States' conventional capabilities and the perceived RMA upset the equilibrium and China retreated to its roots of Mao's asymmetrical warfare. Viewed in this manner, the integration of asymmetrical technologies and strategies (ASAT weaponry or area denial weapons) is an updated version of Mao's asymmetrical tactics of guerilla warfare of turning weakness into strength and an opponent's strength into vulnerability.

Chinese Nuclear Principles

China declares that its nuclear forces remain defensively postured, consistent with its overall military doctrine and national strategy of a peaceful rise. China's military doctrine has evolved from total war concepts involving nuclear weapons to regional conflicts, local in nature and fought for limited political objectives. The evolution of military doctrine shaped force structure and influenced China's military modernization programs. These modernization efforts enhanced survivability, but also improved operational capabilities. Despite an evolution in military doctrine and changes to force structure, China still declares that its nuclear forces remain defensive, characterized by a no-first-use (NFU) pledge.

China has never publically declared a nuclear doctrine to guide the use of nuclear weapons or define their nuclear missions or roles. In fact nuclear doctrine has never driven weapons research and development or guided development of strategic force structure.³⁸ According to some analysts, China has never had a doctrine that links weapons or nuclear capability to strategic goals and foreign policy objectives.³⁹ Given its resource and technical constraints, China could only build a small nuclear arsenal with a retaliatory capability meant that survival would always be an issue, effectively limiting China's options in the military or policy arenas. Unable to coerce or compel actors the reasoning goes, China's nuclear weapons could only be defensive in nature.

According to some western analysts, China's strategic culture is shaped by both a defensive strand that rationalizes relative weakness as defensive and a realpolitik strand that favors violence and military solutions to achieve political goals. It is argued that this culture "predisposes Chinese leaders paradoxically to engage in offensive military operations as a primary alternative in pursuit of national goals, while rationalizing these actions as being purely defensive and a last resort."⁴⁰ In this context, China's defensive posture can be seen as a rationalization of its strategic reality, while the building of military capability at the regional level is consistent with its realpolitik strand of strategic thought. It is through the lens of a realpolitik framework that China's failure to update its nuclear doctrine is examined and the principles that characterize China's nuclear posture: no-first-use (NFU), positive security assurances (PSA), and negative security assurances (NSA) are analyzed.

China has pledged that it will not be the first to use nuclear weapons in a conflict. China's nuclear force posture is defined by this NFU pledge, contending that its strategic forces are intended for defensive purposes. However, this NFU pledge is more a reflection of China's lack

of capabilities than any altruistic tendencies. China currently does not have two key technical pieces that could move its strategic forces beyond its defensive posture. First, its strategic forces lack a national early warning radar system that is capable of detecting incoming missiles.⁴¹ Second it lacks a modern command and control network that could provide a launch on warning capability if incoming missiles were detected.⁴² These two factors combine to place China's strategic forces in a low state of readiness; China's silo-based, liquid-fueled missile systems are stored empty in the silos, taking an estimated twelve hours to load propellant into the missiles.⁴³ Ultimately, given its small nuclear arsenal with limited technical capabilities, China's pledge of NFU is a "virtue out of necessity."⁴⁴

The defensive strategic posture is further defined by its declared negative and positive security assurances. From inception, China has declared that it would not use, or threaten to use nuclear weapons against non-nuclear states. Further the government indicates that it would not use or threaten to use nuclear weapons in nuclear free-zones such as Africa or Latin America.⁴⁵ Moreover, China has accepted the concept of positive security assurances, which bind China to agree to work within the Security Council to provide any necessary assistance to any non-nuclear weapon states that come under attack.⁴⁶ By accepting the concept of a PSA, China is able to oppose the concept of extended nuclear deterrence or the concept of a nuclear umbrella, which allows the United States to extend security guarantees allies in the Pacific region, namely Taiwan and Japan.

Potential contradictions emerge from these declared nuclear principles. First, all of China's nuclear principles are highly symbolic, in particular the pledge of NFU. In fact, if China's strategic culture favors the use of force to resolve conflicts, than the defensive nature of its military policies are a reflection of its lack of capabilities rather than a deeply ingrained

defensive culture. A pledge of NFU is good rhetoric but it is unverifiable until nuclear war actually occurs. But even if it is argued that China is essentially defensive in nature, how does the concept of active defense fit with a NFU pledge? In a nuclear scenario, an NFU policy is reasonably clear: China refuses to use nuclear weapons unless it is attacked with nuclear weapons first (leaving aside the issue of whether it has the capability to conduct a first strike). However, what if conventional weapons are used against the mainland; does a NFU pledge still hold? What if the conventional attack was overwhelming and national sovereignty is at stake; does the NFU still hold? The Chinese view Taiwan as a part of the PRC, would a declaration of Taiwan's independence and defense of it by the United States be viewed as an attack on territorial integrity? China's NFU policy is an unbinding pledge which could very likely be superseded in cases of threats to national sovereignty, territorial integrity or issues of survival.

Another contradiction exists in regards to China's NSA pledges, which prevent the targeting of nuclear forces against non-nuclear states. As part of its force modernization, China has deployed nuclear-armed medium range ballistic missiles against U.S. targets in non-nuclear states such as Japan. A 2006 Pentagon report indicates that China continues to integrate advanced technologies into its strategic systems and develop conventional and nuclear weapon systems for a Taiwan scenario.⁴⁷ Short and medium range ballistic missile systems provide an increasing counterforce capability, at the operational and tactical levels of war, targeting military forces and installations. The targeting of U.S. forces in the region is problematic for the NSA concept: cities in Japan and Guam provide basing to U.S. forces but those cities are part of non-nuclear weapon states.

China's nuclear principles are based on domestic and international conditions that existed during the cold war, when its nuclear program was in its inception. However, China has failed to

update or announce changes to its strategic thinking or potential usage of its nuclear weapons. Lacking openness about its strategic capabilities, changing force structure, and how these relate to its evolving military doctrine, combines to raise speculation about its traditional defensive posture and its impact on its traditional defensive posture is open to speculation. The changing conditions and capabilities present contradictions to its traditional way of thinking, suggesting China's commitment to its NFU pledges and its overall defensive posture is questionable.

Force Modernization

China's concept of deterrence is changing as evidenced by the quantitative and qualitative changes in its ballistic missile force structure. The old strategic doctrine of Mao's era was characterized by a small force structure, minimally capable (retaliatory in nature) and defensive in posture. With a small number of nuclear weapons, deterrence was always vulnerable to a disarming first strike, and required that survivability was a top priority. The small retaliatory force provided little to no options in an escalatory situation where deterrence fails. Force modernization is designed to provide Chinese leadership increasing military capabilities and a greater range of political options, including nuclear and conventional, at a theater level.

China's nuclear weapons development was a constant struggle between resource constraints and security needs. The result is a force structure that developed piecemeal, on an *ad hoc* basis. By 1964, the United States had thousands of nuclear warheads, capable of being delivered by land, air and sea. The Soviet Union had a similar triad capability with a somewhat smaller number of warheads. China, on the other hand, lacked similar force capabilities, and with no prospect of developing comparable numbers or types of weapon systems, the Chinese focus turned to land-based ballistic missiles. John Lewis in his study of China's ballistic missile

programs cites a multitude of factors, including the failed Great Leap Forward, the Cultural Revolution and a denial of Soviet assistance that combined to decimate China's nuclear industries.⁴⁸ Lacking resources and technical expertise, Chinese nuclear and aerodynamic industries struggled to design nuclear warheads and missiles that could deliver them accurately and reliably.

The first generation of ballistic missiles reflected the technological constraints of China's missile program. Development of a strategic nuclear capability occurred in stages, with the design of longer range systems building on the success of shorter range systems. For example, the CSS-2 (2650 Km range) deployed in 1971 provided the first stage for the CSS-3 (4750 Km) deployed in 1980; in turn, the CSS-3 provided the booster stage for China's first ICBM (13,000Km) deployed in 1981.⁴⁹

The three nuclear capable ballistic missiles developed by 1981 were liquid propelled systems launched from either silos or large, bulky transporters that erected and aligned the missile. These liquid systems were defined by their size, for example a CSS-3 intermediate range ballistic missile is 28 meters in length and requires a significant complement of vehicles to fuel, align and check-out the missile.⁵⁰ Moreover, small numbers of these missiles were deployed, with less than 20 CSS-4 ICBM missiles representing the entire strategic nuclear deterrent of the PRC.⁵¹ Similar numbers of intermediate range ballistic missiles (IRMB) were deployed for regional targets. Bottom line is that the first generation of China's nuclear weapons was characterized by their small force structure and their relatively static nature.

Unable to match the large nuclear force structures of the United States or Russia, the challenge of Chinese leadership was to develop and maintain a credible strategic deterrence given the

obvious limitations of its force structure. The first generation of ballistic missiles provided a minimum nuclear deterrent based on a countervalue targeting strategy.⁵² A countervalue strategy is based on having a sufficient number of nuclear weapons that can survive a disarming first-strike and retaliate against a city or major industrial base. A Chinese engineer captured the essence of the countervalue strategy by indicating a missile landing on the Bolshoi Theater was as effective as one landing on the Kremlin.⁵³ Surviving a first strike placed a premium on defensive measures, such as denial and deception techniques, which create ambiguity about actual numbers and their disposition. Creating doubt about quantitative and qualitative capabilities was as important as the operational capabilities of the missiles. In part maintaining a credible nuclear deterrent required perpetuating ambiguity about the actual size and capability of the nuclear arsenal.

Force modernization meant quantitative and qualitative improvements to China's ballistic missile forces. According to a 2009 Defense Department report, "China is developing and testing offensive missiles, forming additional missile units, qualitatively upgrading certain missile systems, and developing methods to counter balance missile defenses."⁵⁴ The Bulletin of the Atomic Scientists indicated that overall China's nuclear arsenal has increased by 25 percent since 2005, while its medium range capability increased from 19-23 MRBM launchers in 2005 to over 60 launchers in 2008—"a 148 percent increase" in three years.⁵⁵ At a time when the United States and Russian are looking to reduce their numbers of nuclear weapons, and President Obama has indicated a goal of complete disarmament, the Chinese continue to increase their nuclear arsenal. Viewed in this context, China is not a status quo power modernizing and expanding its nuclear arsenal to enhance its defensive capabilities but instead a country intent on increasing its comprehensive national power.

The full scope of China's modernization is even more dramatic when it is compared to the first generation of nuclear weapons. Table 1 shows the diversity and growing quantity of weapon systems available to military planners, and as the 2008 Defense Department report to Congress indicates, these numbers are most likely to continue to increase.⁵⁶

Table 1. China's Missile Force

Missile Designator	Missiles	Launchers	Estimated Range	Date Deployed
CSS-2	15-20	5-10	3000	1971
CSS-3	15-20	10-15	5000	1980
CSS-4	20	20	13000	1981
CSS-5	60-80	70-90	1800	1991
DF-31	10	10	7200	
DF-31A	10	10	13000	2006
CSS-6	350-400	90-110	600	1995
CSS-7	700-750	120-140	300	2000
DH-10	150-300	40-55	1500	2007

The largest increase has occurred at the regional level, which has seen the integration of nuclear and conventional capabilities. For example, the CSS-5 MRBM now has at least four known variants, two nuclear and two conventional; one those conventional systems is designed to provide an area denial capability by targeting aircraft carriers and their battle groups.⁵⁷ In some cases the mobile, solid propellant systems are replacing the first-generation liquid propellant systems; however, in other cases these newer mobile systems are augmenting the capabilities of

the liquid systems, as the mobility of the DF-31A is enhancing the survivability of China's CSS-4 silo-based strategic deterrent.

Changes to China's ballistic missile force, the integration of advanced conventional and improved nuclear capabilities are changing China's concept of deterrence. A layered approach to deterrence is developing, characterized by a limited deterrent capability at the operational and tactical levels of war, where a convergence between nuclear and conventional capabilities is occurring. According to Alastair Ian Johnston, limited nuclear deterrence means having enough capability to deter conventional, theater, and strategic nuclear war and suppress escalation during a conflict.⁵⁸ Moreover, a limited nuclear capability implies an ability to respond to any type of tactical or strategic attack, and calibrate responses to the scope of the initial attack.

Implications

China's nuclear forces are a product of an early cold war environment in which China could never match the nuclear arsenals of the two superpowers. Before the mid-1980s, Chinese strategic forces and its strategic thinking was mired in Mao's revolutionary concepts of total war, which consisted of nuclear and conventional conflict. During Mao's rule, China first planned for conflict with the U.S., but increasingly it was a Soviet conventional or nuclear strike that the people's war concept applied to.

The peoples war construct was defensive and based on asymmetrical concepts, absorbing nuclear or conventional blows and preserving enough military capability to conduct guerrilla, and ultimately, conventional warfare. Deng Xiaoping broke this revolutionary mindset by integrating concepts of modern warfare into China's strategic thinking. In the nuclear age, warfare was limited in its objectives and often fought on a regional level for political influence.

China's military modernization was designed to enhance survivability of its nuclear deterrent, but also to address the regional contingencies that China likely faced in the future.

As a result of this change in doctrine, China's missile force structure evolved to match its changing doctrine. A second generation of ballistic missiles was developed that were solid propellant, nuclear and conventionally armed, with ranges designed for regional contingencies. The changing force structure was designed to provide China's leadership with limited military options and the flexibility to deal with regional political issues.

China seems to understand the implications of an arms build-up, remembering the Soviet Union's failed attempts to match the United States strategic forces. Therefore, at the strategic level modernization means enhanced survivability by integrating mobility into its ICBM force. The number of nuclear systems capable of reaching the United States remains relatively small. However, modernization at the theater level not only integrated mobility into force structure, but it has also increased the number of weapon systems designed for a regional conflict. The integration of advanced weapons systems, including ballistic missiles, cruise missiles and submarine launched ballistic missiles, has resulted in a convergence between nuclear and conventional capabilities at the theater level that provides PRC military planners with increased military options. A bifurcation of capabilities is occurring in the way China conceptualizes deterrence. The strategic level is defined by its minimum capabilities but at the regional level China is achieving a limited deterrent capability, which provides an ability to respond to a wide variety of scenarios.

Ultimately China's growing military power is suggestive of its attempt to change the strategic balance in the Asian Pacific region. The modernization of its ballistic missile forces moves it

closer to altering the strategic balance in the Asian theater in China's favor. In an article in Foreign Affairs in 2000, Condoleezza Rice argued that China's weapons modernization and reforms in military doctrine are aimed at promoting vast increases in its national power.⁵⁹ If China is not a status quo power then the implication for the United States is that its power and influence in the Asian theater will be increasingly challenged by a more assertive China. Growing Chinese military capabilities, particularly nuclear, will likely encourage stronger efforts to push the U.S. out of the Asian region and limit U.S. influence by raising doubt about U.S. commitment to the region.

APPENDIX A. Evolution of China's Military Doctrine

Period	Worldview/view on war	Military doctrine	Likely adversary	Scope of likely conflict
1935-1979	Revolutionary/war is inevitable	People's war	Imperialist	global
1979-1985	Revolutionary/war can be postponed	People's war under modern conditions	U.S. before 1970/the soviets after 1960	Global nuclear war less likely emerging regional threats
1985-1991	Peaceful development	Limited warfare	Regional threats most likely involving U.S.	Local based on boarder, ethnic or religious disputes
1991-present	Peaceful rise	Limited war under high tech conditions	Regional threats most likely involving U.S.	Local use of air power, precision guided weapons and information warfare.

Endnotes

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